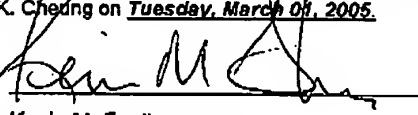


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Univation Technologies, LLC 5555 San Felipe, 19<sup>th</sup> Floor, Houston, Texas 77056 United States of America **Univation**  
TECHNOLOGIESDate: Tuesday, March 01, 2005Number of pages including cover sheet: 16**TO: COMMISSIONER FOR PATENTS**P.O. Box 1450Alexandria, VA 22313-1450Attn: Examiner William K. CheungTelephone: (571) 272-1097Facsimile (703) 872-9306**FROM: KEVIN M. FAULKNER**Univation Technologies, LLC5555 San Felipe Road, Suite 1950Houston, Texas 77056Telephone (713) 892-3729Facsimile (713) 892-3687REMARKS: ☐ Urgent ☒ For your review ☐ Reply ASAP ☐ Please commentRE: **U.S.S.N.: 10/635,684**  
**Filing Date: 08/06/2003**  
**Attorney Docket No.: 1999U026.US-CON3****CERTIFICATE OF FACSIMILE TRANSMISSION**

I hereby certify that this correspondence, consisting of a response to an office action dated February 7, 2005 (11 pages), Affidavit (4 pages) are being facsimile transmitted to the United States Patent and Trademark Office, to facsimile number (703) 872-9306, to the attention of Examiner William K. Cheung on Tuesday, March 01, 2005.

3/1/05  
Date  
Kevin M. Faulkner  
Registration No. 45,427  
Attorney for Applicant(s)

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**RECEIVED  
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Appl. No. : 10/635,864 Confirmation No. 2116  
Applicant : Donald R. Loveday  
Filed : 08/06/2003  
Art Unit : 1713  
Examiner : Cheung, William K.  
  
Docket No. : 1999U026.US-CON3  
Customer No. : 25959  
  
Date : February 18, 2005

Commissioner for Patents  
P.O. Box 1450  
Alexandria VA 22313-1450

**AFFIDAVIT UNDER 37 CFR § 1.132**

Sir:

I, Tae Hoon Kwak declare as follows:

I am a co-inventor of the subject matter claimed and described in the above-identified patent application. The purpose of this Declaration is to demonstrate that the embodiments of the "bimodal polyethylene" as claimed do not possess a homopolyethylene low molecular weight component.

I obtained a M.S. and Ph.D. in Polymer Science & Engineering at the Polytechnic Institute of New York, U.S.A., 1979-1983. I obtained a B.S. in Chemical Engineering at the Hanyang University, Seoul, Korea, 1968-1975.

I have been employed by Union Carbide Corporation, a subsidiary of The Dow Chemical Company, since 1997 to the present, and am a secondee to Univation Technologies, LLC. My title is Development Scientist, Product Development Leader, and Licensing Product Technology Manager/Product R&D.

Application No. 10/635,864  
Docket No. 1999U026,US-CON3  
Reply to Office Action Dated 02/07/2005

From 1992 to 1997, I was employed at Hanwha Chemical Corp., Taejon, Korea and my title was Research and Development Director, Corporate R&D Center.

From 1983 to 1992, I was employed with Mobil Chemical Company, Macedon, NY, and my title was Research Associate (1989-1992), Group Leader/Process R&D, Films Division.

From 1975 to 1978, I was employed with the Korea Institute of Science and Technology/Korea Agriculture Chemicals Company, Seoul, Korea.

Under my direction and control, or under the direction and control of those working in cooperation with me regarding the testing polyethylene copolymers related to the present invention, three samples of high density bimodal resins were tested to determine the presence and level of comonomer-derived units present in the low molecular weight fraction(s) of the bimodal polyethylene made by one embodiment of the present invention. Further, the polyethylene compositions described below were made by a method substantially the same, as outlined below, as certain embodiments of the invention as described in the specification as filed.

The attached **Exhibit A** is a plot of the molecular weight fraction (x-axis) versus the number of comonomer branches per 1000 carbons as measured by  $^1\text{H}$  NMR (y-axis) of certain polyethylene copolymers. In particular, the fractions were collected from SEC fractionation of samples of high density polyethylene copolymers obtained by polymerization of ethylene and 1-hexene using a catalyst system including:

- $\{[(2,4,6\text{-Me}_3\text{C}_6\text{H}_3)\text{NCH}_2\text{CH}_2]_2\text{NH}\}\text{Zr}(\text{CH}_2\text{Ph})_2$ , or  $\{[(2,3,4,5,6\text{-Me}_5\text{C}_6\text{H}_2)\text{NCH}_2\text{CH}_2]_2\text{NH}\}\text{Zr}(\text{CH}_2\text{Ph})_2$ ; and
- (pentamethylcyclopentadienyl)(propylcyclopentadienyl)zirconium dichloride; and
- methylalumoxane as a cocatalyst/activator.

The process of polymerization used was a single fluidized bed gas phase reactor in the presence of the two catalyst components, the activator, ethylene and 1-hexene, simultaneously inside the reactor. The methods of polymerization are otherwise as generally described in the embodiments of Examples 3-5 of the present Application.

The polyethylene copolymers represented in **Exhibit A** have the following properties:

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Sample identity	$\eta_{sp}/c$ (dl/g)	$\eta_{sp}/c$ (dl/g)	$\eta_{sp}/c$ (dl/g)	Density (g/cm <sup>3</sup> )
Circle	8.9	0.084	106	0.9485
Diamond	2.47	0.031	112	0.9508
Triangle	6.6	0.05	133	0.9502

The data represented in Exhibit A was obtained by size exclusion chromatograph (SEC) of the polyethylene compositions above. The fractions were then collected at different molecular weights, and their <sup>1</sup>H NMR spectra obtained. From these spectra, the amount of branching can be determined, that branching being mostly C4 ("butyl") branches in these data, as 1-hexene was the copolymer.

The Exhibit A demonstrates that the low molecular weight component of the compositions made in the above embodiments do possess comonomer. This is indicated by the non-zero (y-axis) values for the number of "branches" at the low-end of the (x-axis) molecular weight range of the plot. A homopolymer would register "zero" branches (y-axis). Thus, polymers produced such as the embodiments of the invention, described in the specification and presently claimed, are copolymers and do not include a low molecular weight component comprising a "homopolyethylene".

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 or Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-referenced application or any patent issuing thereon.

Respectfully submitted,

Feb 21st, 2005

Date



Tae Hoon Kwak

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Docket No. 1999U026.US-CON3  
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**EXHIBIT A**